In re Patent Application of:
BONHOMME
Serial No. **09/993,913**
Filed: **NOVEMBER 6, 2001**
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REMARKS

Applicant wishes to thank the Examiner for the thorough examination of the present application, and for correctly indicating the allowability of the subject matter of Claims 17, 18, 20, 25, 26, 31, 32, 37, 40, and 41. Attached hereto are two (2) replacement drawings sheets to correct the minor informalities helpfully noted by the Examiner. The specification has also been amended to correct the minor typographical errors noted by the Examiner.

In addition, independent Claims 15, 21, 27, 33, and 38 have been amended to more clearly define the subject matter thereof over the prior art. More particularly, these claims have been amended to include subject matter similar to that of dependent Claim 16, which has been cancelled for consistency therewith. Moreover, dependent Claims 16-18, 22-26, 28-31, 34-37, and 39-41 have also been canceled or amended as set forth above for consistency with the amendments to their respective independent claims. No new matter is being added.

In view of the foregoing and the supporting arguments presented below, it is respectfully submitted that all of the claims are patentable and the application is in condition for allowance.

I. The Claimed Invention

The present invention is directed to a method of estimating an impulse response of an information transmission channel in a signal propagation environment. As recited in amended independent Claim 15, for example, the method includes estimating the impulse response based upon a useful number of coefficients of the impulse response, where the useful number of coefficients is a function of the signal propagation environment. The estimation is done by providing an initial estimate of the impulse response based upon a predetermined number of the coefficients, determining a time domain spreading parameter based upon the initial estimate, using the time domain spreading parameter to determine the useful number of coefficients, and providing a final estimate of the impulse response based upon the useful number of coefficients.

Independent Claim 19 is directed to a similar method, independent Claims 21 and 27 are directed to related devices, independent Claims 33 is directed to a related cellular telephone, and independent Claim 38 is directed to a related computer-readable medium. Each of these claims recites that the useful number of coefficients is determined as a function of the signal propagation environment based upon a time domain spreading parameter.

II. The Claims Are Patentable

The present application includes independent Claims 15, 19, 21, 27, 33, and 38. Of these, Claims 15, 19, 21, 27, and 38 are rejected based upon U.S. Patent No. 5,251,233 to Labedz et al., and Claim 33 is rejected based upon Labedz et al. in further view of U.S. Patent No. 6,757,345 to Heinila.

Labedz et al. is directed to an apparatus for equalizing a corrupted signal in a receiver. The equalization system includes a complex matched filter and a maximum likelihood sequence estimator (MLSE) for removing the effects of phase shift, amplitude variations, intersymbol interference, etc. resulting from multi-pathing and noise contributed by the receiver front end. The system estimates a correlation signal C(t) and synchronizes this signal to maximize its energy as seen on the taps of the complex matched filter. Taps having amplitude coefficients below a predetermined threshold are set to zero to produce a modified CIR estimate. The modified CIR estimate is then used to construct the complex matched filter and is also input to the MLSE.

Heinila is directed to a RAKE receiver for receiving signals supplied from a radio path, where each signal that arrives at the receiver is delayed by a unique delay value. The receiver includes a filtering device and a distribution device to determine the strength of a part of a signal delayed by a certain propagation delay by several values of the propagation delay. The distribution device compares the delay differences of the received signals with each other and forms sums of the strengths of the signal parts determined by different values of the propagation delay. The distribution device selects values that deviate at least by a predetermined delay difference whose sum of the strengths of the signal parts obtains the highest possible value. The receiver indicates the received information by using the selected values.

The Examiner correctly acknowledges that Labedz et al. does not disclose determining a useful number of coefficients of the impulse response as a function of the signal propagation environment based upon a time domain spreading parameter, as recited in the above-noted independent claims. However, the Examiner contends that Heinila provides this noted deficiency. It is respectfully submitted that there is no proper motivation or suggestion to selectively combine the references as the Examiner proposes, as doing so would change the principle of operation of Labedz et al.

More particularly, the Labedz et al. receiver uses a matched filter **400** for generating the tap coefficients from the I and Q components of the input signal, which provide an estimate of the CIR for a given timeslot. See FIG. 4 of Labedz et al. Then the tap coefficients for samples having values below a threshold are zeroed out so that only tap coefficients associated with samples assumed not to be corrupted are used in the final CIR estimation. See col. 4 line 39 through col. 5, line 21 of Labedz et al.

In stark contrast, the Heinila receiver is a RAKE receiver including a selector **10**, a plurality of RAKE fingers **20** and a combiner **60**. The selector **10** selects signals to be supplied to each RAKE finger **20**, and the fingers decode the spreading code added to the signal at the transmitter. See, e.g., FIG. 2 and col. 5, lines 25-36 of Heinila. Optimal delays (i.e., spreading code phases) are found for the fingers **20** based upon the impulse response of a measured channel by using a specific optimization algorithm. This is done so that the code phases selected for the RAKE fingers **20** sufficiently deviate from each other, i.e., the fingers are at least a minimum distance away from each other. See col. 3, lines 29-40.

As such, Heinila teaches using delay spreading information for selecting the spreading code phases of RAKE receiver fingers to perform receiver signal filtering. Yet, Labedz et al. excludes (i.e., zeroes out) tap coefficient values which fall below a threshold as the basis for generating final coefficients for use in the signal filtering process. Thus, to somehow use delay spreading information in the selection of the tap coefficients in the Labedz et al. receiver would completely change the principle of operation of this receiver. As such, there can be no proper motivation or suggestion for selectively combining these references as the Examiner proposes.

Accordingly, it is respectfully submitted that independent Claims 15, 19, 21, 27, 33, and 38 are patentable. Their respective dependent claims, which recite still further distinguishing features, are also patentable and require no further discussion herein.

CONCLUSIONS

In view of the foregoing, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance is respectfully requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,

[signature]

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: MS Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 5th day of July, 2005.

[signature]

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In the Drawings:

Attached are two (2) replacement drawing sheets. The changes made to the drawings are explained in the remarks section below.